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Claims

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4 1. Valve-stroke controls for continuously varying the length of
5 the stroke of the valves in an internal-combustion engine and for
6 maintaining the valves constantly closed while the engine is in
7 operation with a more or less upright angled lever (2) laterally
8 actuated by a cam (7), whereby the lever has structures (6 & 7)
9 at the bottom that extend more or less down at a right angle to
10 its longitudinal axis and engage the circumference of a roller
11 (9) mounted on a rocker lever (8) that actuates a valve (1),
12 characterized in that they operate on the principle of a
13 planetary gear, the angled lever (2) executing the function of a
14 planet wheel and being mounted at its upper end in a swivel (4)
15 between two setting levers (5) that exercise the function of a
16 planetary bearing, the setting levers themselves so mounted at
17 their lower ends in a swivel (11) on the cylinder head (10) that
18 the axis of rotation of the swivel (11) is identical with that of
19 the roller (9) that executes the function of a sun wheel on the
20 rocker lever (8) that actuates the valve (2) when the valve is
21 closed, and whereby the structure (7) that maintains the valve
22 (1) constantly closed is constituted by a roll-over surface of a
23 planet wheel in the form of a positively circular arc, whereby
24 the center of the radius of the circle coincides with the axis of
25 rotation of the swivel (4) and the distance between, and the sum
26 of the radius (R7) of the arc and the radius (R2) of the roller

1 (9) equals the distance (2) between the axis of rotation of the
2 swivel (4) on the angled lever (2) and the common axis of
3 rotation of the lower swivel on the setting levers (5) and the
4 roller (9).

5

6 2. Valve-stroke controls as in Claim 1, characterized in that the
7 setting lever (5) employs for that function a cogged circular arc
8 (12) engaged by a cogged shaft (13), the radius of the first set
9 of cogs constituting the center of the axis of rotation of the
10 swivel (11).

11

12 3. Valve-stroke controls as in Claim 1, characterized in that, to
13 allow the actuation of two valves (1), one angled lever (2) is
14 mounted in the swivel (4) on each side of a setting lever (5),
15 each angled lever actuating a rocking lever (8) that actuates a
16 valve.

17

18 4. Valve-stroke controls as in Claim 1, characterized in that the
19 rocking lever (8) that actuates the valve has a valve-play
20 compensator (14) on the end that actuates the valve (1), its
21 upward motion limited by an adjustable counterbearing (15) that
22 is fastened to the cylinder head and provided with a rocker lever
23 (16), ensuring that the controls will function normally even
24 when, say, one valve (1) moves up subject to the impact of the
25 valve seat.

1 5. Valve-stroke controls for continuously varying the length of
2 the stroke and for maintaining the valve constantly closed while
3 an internal-combustion engine is in operation, with a more or
4 less upright angled lever, characterized in that the angled lever
5 (24) is accommodated at its upper end in a swivel (25) fastened
6 to the cylinder head, is actuated below the swivel by a cam (28)
7 mounted on a roller (29) and by way of structures (27 & 28) that
8 extend down at more or less a right angle, and actuates from
9 above a roller (21) mounted on a shaft (22), whereby the shaft is
10 fastened to a longitudinally adjustable rod (23), another rocker
11 (21) is positioned along the axis on each side of the first
12 roller, and each of the other rollers forces down a rocker lever
13 (20) that actuates a valve.

14

15 6. Valve-stroke controls as in Claim 5, characterized in that the
16 structure (26) that maintains the valves (19) constantly closed
17 is a positive circular arc, whereby its radius (19) is provided
18 with a center that lies along the axis of rotation of the swivel
19 (25) that is provided for the angled lever (24) and fastened to
20 the cylinder head.

21

22 7. Valve-stroke controls as in Claim 5, characterized in that,
23 when only one valve (19) is to be actuated, the two other rollers
24 (27) simultaneously drive a rocker lever (20) that actuates the
25 valve and the diameter of the roller in the middle, the one

1 actuated by the angled lever (24) is shorter than those of the
2 two outer rollers.

3

4 8. Valve-stroke controls as in Claim 5, characterized in that,
5 when only one valve (19) is to be actuated, the two other rollers
6 (21) are driven by the angled lever (24) and the roller (21)
7 between them drives the rocker lever (20) that actuates the
8 valves, and the diameter of the roller (21) in the middle is
9 longer than those of the two other rollers (21).

10

11 9. Valve-stroke controls as in Claim 5, characterized in that the
12 setting lever (31) that drives the rod (23) and is subject to a
13 driveshaft (32) is provided with a lever (36) for fastening a re
14 setting mechanism (33) such that, when a short valve stroke is
15 desired, the force of the resetting mechanism (33) increases due
16 to the simultaneously resulting tension of the re-setting
17 mechanism.

18

19 10. Valve-stroke controls for continuously varying the stroke of
20 a valve and for maintaining valves constantly closed in an
21 internal combustion engine while the engine is in operation with
22 a more or less upright angled lever characterized in that the
23 angled lever (38) is actuated at the top and from one side by a
24 cam (40) mounted on a roller (38) and is provided with two
25 structures (44&45) that extend down more or less at a right angle

1 to its longitudinal axis and actuate a roller (47) on a rocker
2 lever (46) that actuates the valve (37), whereby the angled lever
3 (38), between its cammed roller (38) and the downward-extending
4 structures (44&5) is accommodated in the swivel (42) of two
5 setting levers (41) on each side of the angled lever (38),
6 whereby the setting lever (41) is rigidly attached by way of the
7 roller (39) to a driveshaft (43) accommodated in the cylinder
8 head.

9
10 11. Valve-stroke controls as in Claim 10, characterized in that
11 the structure (45) on the angled lever (38) that maintains the
12 valve (37) constantly closed is in the form of a positively
13 circular arc with a radius with a center in the axis of rotation
14 of the swivel (42) employed by the angled levers.

15
16 12. Valve-stroke controls for continuously varying the stroke of
17 a valve and for maintaining valves constantly closed in an
18 internal combustion engine while the engine is in operation,
19 characterized in that a setting disk is mounted in a bearing (54)
20 that is fastened to the cylinder head, whereby the setting disk
21 (53) has an eccentric axis (58), rotating rocker levers (59) are
22 mounted around the axis on each side of the setting disk (52),
23 and the rocker levers are driven by a cam (61) mounted on a
24 roller (60), whereby the rocker levers (59), with their
25 structures (62 & 63) drive the rocker levers (64) that actuate

1 the valves by way of their roller (65), whereby the setting disk
2 (52) rotates around the same axis as the rollers (65), whereby
3 the structures (63) that maintain the valves constantly closed
4 are in the form of a positively circular arc, its radius (R1)
5 radiating out of a center situated along the axis of rotation of
6 its own rocker lever, and whereby the distance (2) between the
7 common axis of rotation of the setting disk (52) and of the
8 roller (65) on the one hand and the axis (58) of the setting disk
9 (52) on the other is the sum of the two radii.

10

11 13. Valve-stroke controls as in Claim 12, characterized in that,
12 when only one valve (51) is to be actuated, the setting mechanism
13 is in the form of two setting disks (52) or setting levers (83),
14 between which a rocker lever (59) actuated by a cam (61) rotates
15 around an axis extending between the two setting disks (52) and,
16 when three valves (51) are to be actuated, rocker levers (59)
17 actuated by a cam (61) rotate around an axis (58) extending out
18 of the surface of the setting disk.

19

20 14. Valve-stroke controls as in one or more of claims 12, 13 or
21 20 characterized in that by means of adjacent and oppositely
22 oriented rocker levers (63) appropriately positioned on at least
23 two axes (58) of the setting disks (52) or setting levers (63) on
24 the setting disk (52), the valves are actuated by various cams
25 (61) in sequence, in that, as the setting disk (52) revolves, one

1 group of rocker levers (59), pointing along one sense of
2 rotation, becomes available for engagement whereas another group,
3 of rocker levers (59), pointing in the other sense,
4 simultaneously withdraws from the range of possible engagement
5 with the cams.

6

7 15. Valve-stroke controls for continuously varying the length of
8 the stroke and for maintaining the valves constantly closed in an
9 internal-combustion engine while the engine is in operation,
10 characterized in that, to prevent phase shifting on the part of
11 the valve actuation due to setting of the controls, the cammed
12 roller (69) is secured to a more or less horizontal control (68)
13 that rotates around a driveshaft (10), a rocker lever (11) is
14 positioned under and paralleling the control rod (68) one end of
15 the rocker lever is accommodated in a swivel (12) on a setting
16 lever (13) that is fastened to and rotates along with the
17 driveshafts (10), whereas the other end of the rocker lever (11)
18 is accommodated in the swivel (14) in a preponderantly upright
19 linkage rod (15) connected to the shaft of the roller (49),
20 whereby the distance between the axis of rotation of the roller
21 (69) and that of the swivel (14) on the one hand and between the
22 axis of rotation of the driveshaft (30) and that of the swivel
23 (72) on the other are identical.

24

25 16. Valve-stroke controls as in Claim 15, characterized by

1 another rocker lever (76) below the rocker lever (71) that
2 parallels the rod, whereby the second rocker lever actuates the
3 valve (67) and is provided with a roller (73) that engages toward
4 the top a negative downward facing circular arc (18) on the first
5 rocker lever (71), and the radius (R1) of the arc equals the sum
6 of the distance (L) and of the radius (R2) of the roller (77) on
7 the rocker lever (16).

8

9 17. Valve-stroke controls as in Claims 12, 13 and 14,
10 characterized in that, in order to prevent a shift in the valve
11 actuation phase due to setting as recited in Claim 15, the rocker
12 lever (59) is actuated by way of a preponderantly upright linkage
13 rod provided with a cammed roller, whereby the roller is fastened
14 to a horizontal guidance rod fastened to the cylinder head.

15

16 18. Valve-stroke controls as in Claim 15 characterized by a
17 resetting mechanism (80), one end of which is attached by way of
18 a swivel (81) in a lever (82) connected to the guidance rod (68)
19 and the other end of which to the cylinder head, forcing the
20 cammed roller (69) against the cam (19).

21

22 19. Valve-stroke controls as in claims 1,5,10,12 and 15 and in
23 accordance with the Claims 52, 62, 13, 14, 84, 94, 103, 112, 124
24 and 134 in Patent Application 10 036 313. 3 - 13, characterized
25 in that all the cammed and other rollers that actuate the valves

1 are at least to some extent replaced by integrated low-friction
2 structures.
3
4 20. Valve-stroke controls for continuously varying the length of
5 the stroke and for maintaining the valves constantly closed in an
6 internal-combustion engine while the engine is in operation,
7 characterized by a setting component that pivots in a bearing
8 block (54) fastened to the cylinder head (53), whereby the axis
9 (58) of the setting component is eccentric, whereby at least one
10 rocker lever (59) rotates around the axis actuated by a cam (61),
11 mounted on a roller (60), whereby the rocker lever (59) is
12 provided with structures (62&63) that actuate other rocker levers
13 (64) by way of rollers (65) and whereby the other rocker levers
14 actuate valves (51), and whereby the axis of rotation of the
15 setting component is also the axis of rotation of the rollers,
16 whereby the structures (63) that maintain the valves (51)
17 constantly closed are in the form of a positive circular arc,
18 whereby the radius (R1) of the arc extends out of a center
19 located in the axis of rotation of its rocker lever (59), and
20 whereby the sum of the radii (R1&R2) of the rollers (65) equals
21 the distance (L) between the common axis of rotation of the
22 setting component (52) and of the rollers (63) on the one hand
23 and of the axis (58) and of the setting component on the other.
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